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In fall 1992, a random, worldwide sample of 5,474 enlisted personnel and 4,036 officers was surveyed on satisfaction with twenty-eight attributes of Army dental care using self-administered questionnaires. Simple descriptive statistics for each attribute were derived as was a composite overall satisfaction score using factor analysis. Composite scores were regressed on demographics, dental utilization, and access barriers to identify those factors having an impact on a soldier's overall satisfaction with Army dental care. Results show above average satisfaction with most attributes of Army dental care except access attributes. Dental utilization and age exerted a positive impact on overall satisfaction; access barriers and assignment to a combat unit a negative impact. The impact of race was mixed. Age had the strongest impact on overall satisfaction. Results suggest that improving satisfaction with Army dental care must come from improving access. This can only be attained by increasing dental manpower and resources.

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Satisfaction with Military Dental Care by Active Duty Soldiers

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In Fall 1992, a random, worldwide sample of 5,474 enlisted personnel and 4,036 officers was surveyed on satisfaction with 28 attributes of Army dental care using self-administered questionnaires. Simple descriptive statistics for each attribute were derived, as was a composite overall satisfaction score using factor analysis. Composite scores were regressed on demographics, dental utilization, and access barriers to identify those factors that have an impact on a soldier's overall satisfaction with Army dental care. Results show above average satisfaction with most attributes of Army dental care except access attributes. Dental utilization and age exerted a positive impact on overall satisfaction; access barriers and assignment to a combat unit had a negative impact. The impact of race was mixed. Age had the strongest impact on overall satisfaction. Results suggest that improving satisfaction with Army dental care must come from improving access. This can be attained only by increasing dental manpower and resources.

Introduction

One of the cornerstones of a Total Quality Management, Continuous Quality Improvement, or any Quality Assurance program is customer satisfaction.¹⁻³ According to Kress and Silversin, quality of dental care can be measured with six key components: access, availability/convenience, cost, pain, technical quality, and interpersonal skills of the dentist and his/her staff.

Despite a commitment to Total Quality Management in the delivery of dental services, the U.S. Army Dental Corps has never conducted a formal survey to measure customer (patient) satisfaction with military dental care. The purpose of this study was to assess the satisfaction of active-duty soldiers with key components of military dental care so that problem areas could be identified for improving the Army Dental Care System. This study also sought to identify demographic characteristics and other factors that influence a soldier's level of satisfaction with military dental care.

Methods

Data for this study come from the Fall 1992 Sample Survey of Military Personnel (SSMP). The SSMP is administered semi-annually by the Army Personnel Survey Office of the U.S. Army Research Institute for the Behavioral and Social Sciences. The SSMP selects a random, representative, worldwide sample of soldiers by using the last two digits of a soldier's

social security number to draw a sample from a computerized roster of all active-duty Army personnel. For the Fall 1992 SSMP, 5,474 enlisted and 4,036 officer personnel returned survey questionnaires. The overall survey response rate was 62%; however, response to individual questions varied due to non-response.

Respondents were asked to evaluate 23 attributes of military dental care using a five-point, Likert-type scale (1 = poor, 2 = fair, 3 = good, 4 = very good, and 5 = excellent). The evaluation was limited to care received within the past 24 months. Respondents were also asked to rate five attributes of military dental care over their entire military career using a different five-point, Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree). In addition, the questionnaire collected extensive demographic characteristics (age, sex, race, education, years of active-duty service, rank, location of assignment, and type of unit) and information on dental utilization and access barriers to dental care.

The data were analyzed using STATA statistical software. Simple descriptive statistics of the level of satisfaction for each attribute of military dental care were calculated weighting the data by rank, gender, and assignment location to reflect the Army population.

A composite score representing satisfaction over all 23 attributes of dental care measured over the past 24 months was derived using factor analysis (principal components method). Satisfaction attributes measured for a soldier's entire career were not included in the composite score because they measured satisfaction over a different time frame. Composite scores were then converted into an overall dental care satisfaction index, a continuous variable with a mean value of 100 and standard deviation of 10. Finally, backwards, step-wise, linear regression analysis was applied to determine the influence of demographic characteristics, dental utilization, and access barriers (all entered into the model as dichotomous or categorical variables) on a soldier's overall satisfaction with dental care. This was done to determine the influence of each single independent variable on the outcome or dependent variable, holding the other independent variables constant.⁵

Results

Tables I and II present descriptive statistics (means and frequencies) for the 28 attributes of military dental care measured in this study. The attributes are grouped by key components. The data in Table I were weighted to reflect the 98.2% of the Army population ($N = 574,443$) that has seen a dentist within the past 2 years. The data in Table II, which focus on satisfaction with dental care over a soldier's entire military career, were weighted to reflect the total Army population in Fall 1992 ($N = 584,973$).

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TABLE I
SOLDIERS' RATINGS OF MILITARY DENTAL CARE RECEIVED WITHIN PAST 24 MONTHS

Component and Attribute	Satisfaction Level					Mean (SD)
	Poor	Fair	Good	Very Good	Excellent	
Access						
Access to specialty care	14.2%	23.7%	44.8%	11.9%	5.9%	2.71(1.03)
Access to emergency care	9.8%	22.8%	46.9%	13.6%	6.9%	2.85(1.00)
Making appointments by phone	25.2%	21.5%	35.9%	11.3%	6.1%	2.52(1.16)
Waiting time in clinic to see DDS	18.0%	27.2%	36.4%	12.7%	5.6%	2.61(1.09)
Time between making appointment and day of visit	23.6%	27.7%	35.0%	9.4%	4.2%	2.43(1.08)
Time between check-up and follow-up care	21.8%	27.8%	36.4%	9.8%	4.2%	2.47(1.06)
Ability to see same DDS	26.3%	27.0%	30.7%	10.1%	5.9%	2.42(1.15)
Availability/Convenience						
Hours military clinics open	4.8%	20.1%	54.0%	14.1%	6.9%	2.98(0.90)
Convenience of clinic	4.6%	16.3%	44.7%	19.7%	14.8%	3.24(1.04)
Parking availability	10.7%	18.3%	43.2%	16.6%	11.1%	2.99(1.15)
DDS thoroughness and accuracy	6.1%	20.8%	48.6%	16.8%	7.7%	2.99(0.96)
Skill, experience, and training of DDS	4.2%	17.6%	47.9%	20.6%	10.4%	3.15(0.97)
Thoroughness of treatment	5.1%	19.4%	47.1%	19.2%	9.1%	3.08(0.97)
Advice for avoiding dental problems	5.1%	16.4%	46.7%	21.2%	10.5%	3.16(0.99)
Interpersonal						
Friendliness & courtesy of administrative staff	9.1%	20.8%	44.6%	16.5%	9.0%	2.96(1.05)
Friendliness & courtesy of DDS & dental staff	6.2%	18.3%	44.1%	19.1%	12.4%	3.13(1.05)
Explanation of dental procedures	6.7%	20.0%	45.7%	17.5%	10.1%	3.04(1.02)
Attention given to you	7.1%	19.5%	46.8%	17.5%	9.1%	3.02(1.01)
Personal interest in you	8.7%	23.3%	42.7%	16.7%	8.5%	2.93(1.04)
Respect shown to you	6.0%	19.1%	45.5%	19.0%	10.5%	3.09(1.02)
Reassurance shown to you	5.9%	20.4%	46.9%	17.9%	9.0%	3.04(0.99)
Amount of time spent with you by DDS	6.7%	23.6%	48.5%	14.1%	7.1%	2.91(0.96)
Global						
Overall quality	5.7%	19.0%	46.0%	18.9%	10.4%	3.09(1.01)

TABLE II
SOLDIERS' RATINGS OF MILITARY DENTAL CARE OVERALL

Component and Attribute	Satisfaction Level					Mean (SD)
	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree	
Access						
Easy access to dental care	7.5%	18.5%	20.6%	44.5%	8.9%	3.29(1.10)
Easy access to dental specialists	6.3%	12.7%	25.9%	44.9%	10.2%	3.40(1.04)
Usually kept waiting long at DDS	9.0%	30.6%	29.4%	21.4%	9.7%	2.92(1.12)
Pain						
Avoid DDS because it's painful	23.0%	35.0%	21.4%	14.9%	5.7%	2.45(1.16)
DDS should do more to reduce pain	6.6%	16.5%	43.1%	23.6%	10.2%	3.14(1.02)

Regarding military dental care received within the past 24 months (Table I), most attributes of care had mean satisfaction scores between good and very good. The notable exceptions were those attributes under the access component which had scores that fell between fair and good on average.

Measures of satisfaction over a soldier's entire military career were limited to general access and pain attributes. On average, soldiers were more likely to agree than disagree that they have easy access to dental care and to dental specialists. And they were more likely to disagree than to agree that they are usually kept waiting a long time at the dental clinic before seeing a dentist. Regarding pain—on average, they were more

likely to disagree than to agree that they avoid seeing the dentist because it is painful. Nonetheless, they were more likely, on average, to agree than disagree that dentists should do more to reduce pain.

Table III presents the variables used in the linear regression model to explain satisfaction with military dental care. The data for this analysis were not weighted to reflect the population. Because every record must be complete for all variables used in a regression analysis, the sample size for this analysis reduced to 5,600. Results show that education level, rank (officer versus enlisted), location of assignment (OCONUS versus CONUS), and years of active-duty military service had no im-

TABLE III

VARIABLES USED IN DENTAL CARE SATISFACTION MODEL

Dependent Variable
SATIDX (Dental Satisfaction Index Score)
Independent Variables
Demographics
AGE (Age group)
Age 1—17–19 years old
Age 2—20–24 years old
Age 3—25–29 years old
Age 4—30–34 years old
Age 5—35–39 years old
Age 6—40–44 years old
Age 7—45–49 years old
Age 8—50–54 years old
Age 9—55+ years old
RACE (Racial group)
Race 1—White
Race 2—Black
Race 3—Hispanic
Race 4—Asian
Race 5—Other
MALE (Male gender) (0 = No, 1 = Yes)
EDUC (Education level)
Educ 1—less than high school
Educ 2—high school
Educ 3—some college
Educ 4—college or more
OFFICER (Officer status) (0 = No, 1 = Yes)
COMBAT (Assigned to a combat unit) (0 = No, 1 = Yes)
YRS (Years of active military service)
Yrs 1—up to 1 year of service
Yrs 2—1–5 years of service
Yrs 3—6–10 years of service
Yrs 4—11–15 years of service
Yrs 5—16–20 years of service
Yrs 6—More than 20 years of service
OCONUS (Assigned overseas) (0 = No, 1 = Yes)
Dental Utilization
SEEDDS (Have seen a dentist within the past year) (0 = No, 1 = Yes)
Access Barriers
CANTGO (Needed dental care but could not go) (0 = No, 1 = Yes)

impact on satisfaction with military dental care. However, dental utilization, barriers to access, and certain demographic factors (race, age, and assignment to a combat unit) did have an impact. The magnitude and direction of the impact are denoted by the size and sign, respectively, of the coefficient of each independent variable in Table IV. Age, especially for those over 40 years old (age group 6 and higher), had the strongest impact on satisfaction with military dental care. Across age groups, the impact was consistently positive and increased with age. Soldiers 55 years of age and older (Age 9) had mean dental satisfaction scores 13.05 points higher than the referent age group of 17- to 19-year-olds (Age 1). Access barriers (CANTGO) had the second strongest impact on satisfaction with military dental care. Soldiers who encountered access barriers to seeking military dental care tended to have lower satisfaction scores, on average, than soldiers who did not encounter such

TABLE IV

MULTIPLE REGRESSION COEFFICIENTS WITH 95% CONFIDENCE INTERVALS FOR DENTAL SATISFACTION INDEX SCORE (N=5,600)

Independent Variable	Coefficient	95% CI	p-value
SEEDDS	1.12	(0.48–1.76)	0.000
CANTGO	–5.18	(–5.70 to 4.66)	0.000
COMBAT	–2.16	(–2.71 to 1.61)	0.000
Race			0.000
Race 2	1.29	(0.62–1.95)	
Race 3	–0.61	(–1.54–0.31)	
Race 4	0.66	(–0.88–2.20)	
Race 5	–1.21	(–3.08–0.65)	
Age			0.000
Age 2	1.34	(–0.46–3.14)	
Age 3	1.51	(–0.30–3.32)	
Age 4	3.13	(1.31–4.94)	
Age 5	3.83	(2.02–5.65)	
Age 6	5.32	(3.48–7.16)	
Age 7	8.49	(6.57–10.42)	
Age 8	7.79	(5.40–10.17)	
Age 9	13.05	(9.23–16.87)	

barriers. Likewise, assignment to a combat unit tended to lower dental satisfaction scores.

The effect of race on dental satisfaction scores was mixed. Blacks (Race 2) and Asians (Race 4) tended to be more satisfied, on average, with military dental care than whites, the referent group (Age 1). Hispanics (Race 3) and other minorities (Race 5) tended to be less satisfied. However, with the exception of blacks, the 95% confidence interval for the regression coefficient for all other racial groups bounds zero; thus, it suggests no significant difference with the referent group. Nonetheless, these confidence intervals are skewed, suggesting that the effect may be important.⁶

Discussion

The attributes of military dental care measured in this survey fell into all but one of the six key components of quality dental care identified by Kress and Silversin.⁴ The cost component was eliminated because it is irrelevant in the military setting, where dental care is provided free of charge to soldiers.

This study provides two major findings. The first major finding is that soldiers, on average, rate most key components of quality of Army dental care between good and very good. Interpersonal skills of dental clinic staff, the technical quality of care received, and the availability/convenience of dental care all received favorable ratings from active-duty soldiers. However, one key component, access, received less favorable ratings. Soldiers, on average, rated access attributes, i.e., access to specialty and emergency care, ability to see the same dentist, and queues for care, between fair and good.

These results suggest that efforts to improve satisfaction with Army dental care should focus on access attributes. With the exception of ability to see the same dentist, access attributes can only be improved by increasing dental manpower or by increasing efficiency in delivery of services in the Army Dental Care System. Given the ongoing emphasis that efficient

